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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/661,632

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Chung-Sam Jun

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27849

7590

09/23/2008

LEE & MORSE, P.C.

3141 FAIRVIEW PARK DRIVE

SUITE 500

FALLS CHURCH, VA 22042

EXAMINER

PATEL, JAYESH A

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

09/23/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/661,632	<b>Applicant(s)</b> JUN ET AL.	
	<b>Examiner</b> JAYESH A. PATEL	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 7,12,14-17 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-11,13,18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action dated May 20 2008 with respect to independent claims 1 and 9 is persuasive and, therefore, the finality of that action is withdrawn. A non final rejection with respect to the claim amendment dated May 20 2008 is presented below.

The amendment dated September 02 2008 will not be entered as it requires further search and consideration due to the amendments and addition of new claims.

Claims 7, 12, 14-17 and 19 are cancelled.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 5-6, 9-11 and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Montillo et al. (US 6647132) hereafter Montillo in view of Yamaguchi et al. (US 7095884) hereafter Yamaguchi.

Regarding Claim 1, Montillo discloses a method for analyzing a sample

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**(Figs 1,3)** by employing a Fast Fourier Transformation method, comprising: generating an image of a region of the sample to be analyzed **(Fig 1 elements 116 generating an image of a sample 112, Col 4 Lines 6-7)**; generating data having a frequency from a plurality of portions **(sub-regions at Col 6 lines 33-34)** of the image by the Fast Fourier Transformation method **(at Col 6 lines 56-58 and Col 7 Lines 24-25)**; and determining whether the region is normal or abnormal **(identifying regions of similar structure (normal) from within regions of non-similar (abnormal) texture at Col 4 Lines 42-43)** based on a comparison of portions of the data generated by the fast fourier transformation method without using a separate reference sample at **(Col 9 Lines 24-40 where the comparing frequency spectrum between the sub-regions is performed within the same sample and no reference frequency or sample image is used for the comparison.)**. Montillo is silent and however does not disclose providing an alarm when the region is abnormal.

Yamaguchi discloses sounding an alarm when an abnormal sample is detected at **(Col 15 lines 62-67 and Col 12 lines 62-67)**. Montillo and Yamaguchi are combinable because they are from the same field of endeavor and are analogous art. The suggestion/motivation would be the lithography system stops in response to the warning **(i.e. stopping the process when the defect is detected and providing an alarm to the operator)** and thus the fabrication of an antireflection film could be minimized at **(Col 16 Lines 34-48)** as taught by Yamaguchi, therefore it would be obvious for one of ordinary skill in the

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art at the time the invention was made to combine Yamaguchi with Montillo to achieve the limitations as claimed in claim 1.

Regarding Claim 2, Montillo and Yamaguchi discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo further disclose wherein the region includes a periodically formed pattern as shown in **(Fig 5 Elements 506 is a periodic frequency spectrum of the region 504)**. Yamaguchi also discloses periodic patterns at **(Col 16 Line 31)**.

Regarding Claim 5, Montillo and Yamaguchi discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo also discloses that the image is captured by the video camera as seen in Fig 1. Montillo however is silent and does not disclose wherein the image is generated by a scanning electron microscope.

Yamaguchi discloses in wherein the image is generated by a scanning electron microscope at **(Fig 3 Col 5 Lines 66-67)**.

Regarding Claim 6, Montillo and Yamaguchi disclose the method for analyzing a sample by employing a fast fourier transformation method as claimed in claim 1. Montillo disclose further comprise defining the image into at least two

pixel units **(image data or Pixels at Col 4 lines 7-8 where pluralities of pixels are at least two pixels).**

Claim 9 is a corresponding apparatus claim of Claim 1. See the explanation of Claim 1.

Regarding Claim 10 see the explanation of claim 5.

Regarding Claim 11, Yamaguchi discloses displaying the image at **(Col 12 lines 65-67).**

Regarding Claim 18, Montillo and Yamaguchi discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo further discloses wherein analyzing the generated data includes using solely the data generated from the image as in **(figs 1,2 and Col 6 Lines 56-58).** Yamaguchi also discloses observing the shape of the line (roughness or width) while taking an image at **(Col 3 Lines 18-28).**

3. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montillo in view of Yamaguchi and in further view of Russell (US 6731824) hereafter Russell.

Regarding Claim 3, Montillo and Yamaguchi discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo discloses the image of the semiconductor wafer as seen in fig 1 and the periodic pattern as seen in Fig 5 element 506. Montillo and Yamaguchi however do not disclose wherein the region is formed on a semiconductor substrate and corresponds to a cell region including a periodic pattern.

Russell discloses wherein the region is formed on a semiconductor substrate and corresponds to a cell region **(many single regular circuit structures forming a cell)** including a periodic pattern in **(Figs 2, 6 and Col 5 Lines 63-64)**. Montillo, Yamaguchi and Russell are combinable because they are analogous art and from the same field of endeavor. The suggestion/motivation would be the method and system is fully automatic, fine tunable at **(Col 2 Lines 47-48)** disclosed by Russell, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to combine the teachings of Russell in the method and system of Montillo and Yamaguchi to achieve the claim limitations.

Regarding Claim 4, Montillo, Yamaguchi and Russell discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as Claimed in claim 3. Russell further discloses wherein the periodic

pattern has a line width (**edges of the single regular circuit structure in fig 2**) and is formed by an etching process.

4. Claims 8, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi in view of Montillo.

Regarding Claim 8, Yamaguchi discloses a method (**Fig 13**) for analyzing a sample by employing a Fast Fourier Transformation method, comprising: generating a magnified image (**magnification image at Col 6 Lines 11-14 and Col 14 line 61-67, Col 17 lines 9-16 where the width of the line pattern is measured**) of a minute pattern formed in a cell region of a semiconductor substrate and measuring a line width of the minute pattern using the magnified image. Yamaguchi further discloses measuring the line width of the minute pattern and generating data having frequency from a plurality of portions of the image are simultaneous at (**Col 6 Lines 8-12, Col 8 Lines 42-48 and Col 12 lines 8-14, 52-67 where the frequency data with respect to the image and measuring the line width (roughness) measuring and comparison is performed simultaneously**). Yamaguchi also discloses measuring the line width of the minute pattern using the magnified image at (**Col 6 Lines 6-16**). Yamaguchi further discloses Fourier transform (**Col 8 Lines 34-48**) is silent and however does not disclose generating data having a frequency from a plurality of portions of the image by the Fast Fourier Transformation method;



and determining whether the region is normal or abnormal based on a comparison of portions of the data generated by the Fast Fourier Transformation method without using a separate reference sample.

Montillo discloses generating data having a frequency from a plurality of portions **(sub-regions at Col 6 lines 33-34)** of the image by the Fast Fourier Transformation method **(at Col 6 lines 56-58 and Col 7 Lines 24-25)**; and determining whether the region is normal or abnormal **(identifying regions of similar structure (normal) from within regions of non-similar (abnormal) texture at Col 4 Lines 42-43)** based on a comparison of portions of the data generated by the fast fourier transformation method without using a separate reference sample at **(Col 9 Lines 24-40 where the comparing frequency spectrum between the sub-regions is performed within the same sample and no reference frequency or sample image is used for the comparison.)**. Yamaguchi also discloses the appearance of the pattern in the image **(two lines of four edges is within the same image without using the separate reference sample)** is good or not at **(Col 15 lines 34-67)**. Yamaguchi and Montillo are combinable because they are from the same field of endeavor and are analogous art. The suggestion/motivation would be the method and system as disclosed by Montillo is automatic and fine tunable at **(Col 2 Lines 47-48)**. Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to combine Montillo with Yamaguchi to achieve the claimed invention.

Claim 13 is a corresponding apparatus claim of claim 8. See the explanation of Claim 8.

Regarding Claim 20 see Yamaguchi at **(magnification image at Col 6 Lines 11-12 and Col 14 line 61-67)** for the magnified image and discloses whether the region is normal or abnormal at **(Col 15 lines 34-67)**.

#### ***Other cited prior art***

The other cited prior art relevant to the subject matter but not relied on are (US 5513275), (US 3993976), (US 5274434), (US 4881269), (US 6909930) and (US 6107637).

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

09/18/08

/Jayesh A Patel/  
Examiner, Art Unit 2624

/Jingge Wu/  
Supervisory Patent Examiner, Art Unit 2624